RIVERS AND FLOODS

By R. E. SPENCER

Mississippi drainage.—Of the floods in the tributaries of the lower Ohio, only those in the Green and Cumberland Rivers were of importance. The Cumberland rise was fully discussed in the June issue of this REVIEW; and of that in the Green, and in the Ohio from the mouth of the Green to the mouth of the Wabash, the official in charge of the Weather Bureau office at Evansville, Ind., reports in part as follows:

Computation from as complete a survey as it has been possible to make indicates that, in the Evansville district, fully 41,750 acres, mostly in corn, tobacco, and soy beans, were inundated by the flood waters, with a total loss of crops amounting to $1,252,500. It is estimated that $14,300 was lost from suspension of business, and that there was damage to bridges and highways amounting to $8,800.

There was no loss of stock or movable property reported, and, as a result of timely warnings, reports indicate that it was possible in a number of instances to bank considerable acreage of corn sufficiently to save the crop, the total saving amounting to several thousands of dollars.

The above flood is the first of record for the Evansville district for the month of July.

As was shown in the flood table in the June REVIEW, floods were general in the St. Louis (Mo.,) river district during that month, notably in the lower Missouri and in the Grand, Osage, Meramec, and Black (of Missouri) Rivers. The Meramec flood continued into July, and a second serious rise occurred in the Grand following the 22d of this month. In addition, and particularly during June, there were many instances of direct damage to fields by excessive and continuous rainfall, as well as numerous overflows, destructive principally to bridges and highways, from small streams. From all causes the major damage was, of course, to the corn crop, and in somewhat lesser measure to shocked wheat. For the two-month period the proportion of this crop loss attributable to overflow from the major streams alone is conservatively estimated at $1,500,000; and, as stated above, there was, of course, very material additional damage done along small creeks and directly by the rains themselves. Flood warnings, which were timely and accurately verified, proved of value principally in enabling farmers to move shocked wheat to places of safety. The saving thus effected amounted to about $50,000.

The Illinois River flood of July was without consequence, except for a temporary interference with engineering operations along the upper river.

In the Cairo (Ill.) district the combined losses occasioned by the floods in the Mississippi River from Cape Girardeau to New Madrid, Mo., and in the Ohio River below the mouth of the Wabash were also decidedly heaviest in crops. A table of losses for this district follows:

Tangible property	$20, 300
Farm property:	
Matured crops	40, 000
Prospective crops	1, 308, 625
Live stock	2, 000
Suspension of business	49, 000
Total	1, 419, 925

Value saved through Weather Bureau warnings, $134,000.

Of the floods in the Memphis district, comprising the Mississippi from New Madrid to the mouth of the Arkansas, and the St. Francis River in Arkansas, the official in charge of the Weather Bureau office at Memphis reported as follows:

THE MISSISSIPPI RIVER

Beginning with the month of April, 1928, the Mississippi River in this district, in a series of rises, alternating with falls of successively shorter duration, reached higher crests each month, culminating in a crest stage of 34 feet at Cottonwood Point on July 7 and 8; 35.9 feet at Memphis on July 10, and 45.7 feet at Helena on July 12 and 13. At Memphis the river was above the bank full stage two days early in May 12 days in June, and 16 days in July, and at Helena on 4 days in April, 11 days in May, 13 days in June, and 20 days in July.

The crest stages in this district were the greatest of record for July, exceeding the previous maximum for that month at Memphis by 2.2 feet, and the crest stage at Helena was 4.1 feet greater than any recorded July stage at that place.

THE ST. FRANCIS RIVER IN ARKANSAS

A series of heavy rains in the first two decades of June caused three separate rises in the St. Francis River, culminating in the highest stage of record or tradition at St. Francis, Ark., at 11 a. m., on June 26—26.7 feet, or 0.3 foot higher than the previous highest stage of April 18, 1927. At Marked Tree, Ark., the rise began on June 9, when the stage was at 7.1 feet, nearly 10 feet below the flood stage. It continued steadily, reaching the flood stage of 17 feet on June 26 and cresting at 18.3 feet on July 5. The fall at Marked Tree was slow, the river remaining at 18.3 feet from July 5 to 10, inclusive, and not passing below the flood stage until July 20.

Backwater from the Mississippi River, augmented by flood water from the upper St. Francis and Little Rivers, appeared in places in the lower St. Francis Basin as early as June 14, and near Marianna, in Lee County, by June 25. The water varied in depth from 1 to 7 feet, but averaged 3 to 4 feet, and receded July 18 to 20. The water reached a greater depth in the backwater area of the lower St. Francis Basin than ever known before in July, and receded too late in the season to permit of raising any crops of consequence in the area that overflowed.

Losses were extremely high, as, with a flood of such severity thus late in the growing season, they were bound to be. Weather Bureau flood warnings of a high order of accuracy, and issued well in advance of the destructive stages, were the means of a saving of $1,285,000 in matured crops hastily harvested and preserved by safe housing, in matured crops protected by temporary levees, in levee protection, in the adjustment of logging and other operations to cope as well as possible with flood conditions; but the reported unavoidable losses nevertheless totaled $6,070,000, exclusive of railroad losses. In his comment on losses the official in charge at Memphis states:

The loss of prospective crops in the backwater area is greater than that of any previous year of record on account of the lateness of the flood. Even last year, 1927, the water in the overflowed area receded in time to make corn and forage crops. The reported losses are itemized below, and in addition to these a total expense for the cost of building private levees, amounting to $37,558.77 was reported to this office, and this is, doubtless, only a small part of the total expended for this purpose.

Table of flood losses, Memphis (Tenn.) district, June-July, 1928

Tangible property	$500, 000
Farm property:	
Matured crops	100, 000
Prospective crops (213,325 acres)	5, 325, 000
Livestock, etc	5, 000
Suspension of business	140, 000
	6, 070, 000

Value of property saved through warnings, $1, 285, 000.

Of conditions in the Vicksburg (Miss.), district, where high water had persisted, as in the Memphis district, through spring and early summer, the official in charge of the Weather Bureau office at Vicksburg reports as follows:

Coming as a distinct flood near the middle of the summer, the present flood is without precedent, new records being made for high water at Vicksburg for the months of July and August, the previous record for August having been made in 1875.

Although no loss of human life or of livestock was reported, the damage in destruction of growing crops was extremely heavy being heightened by the fact that the region affected suffered overflow the previous year (1927), and this crop had been put in and brought to the cultivation stage by the extensive employment of credit and charity agencies; also, the subsidence of the flood mostly came too late in the season for emergency or substitute crops to be successfully grown during the present year.

Figures obtained from the Mississippi River Commission indicate that 387,712 acres, practically all in the lower Yazoo-Mississippi Delta, was flooded this summer, of which area about 94,400 acres was in growing crops at the time of submergence.

Damage to highways and bridges, while not extensive, also occurred, with various expenditures and damages, such as private and municipal levees and bulwarks, incident to flood protection, the exact amount of which can not be ascertained, much of it being intangible, as the moving away of plantation employees, owing to lack of work.

Considering all losses due to the flood in this vicinity in 1928, it is believed that a total of $1,750,000 would be a conservative estimate thereof.

Full data on the extent of overflow and the damage done in the reach of the Mississippi within the New Orleans district had not been assembled in time for inclusion in this report. A preliminary statement from New Orleans notes, however, the important similarity of the effect of the flood upon crops in that district to that in other districts to the north. A portion of this statement follows:

The time of occurrence of the rise was unfortunate for crops planted in backwater areas above the mouth of the Red Rive and in smaller areas, where the bluffs between Vicksburg and Baton Rouge are interrupted by more open areas around the mouths of small eastern tributaries of the Mississippi.

Further overflow from the open crevasse in the lower western levee, or Port Barre South Levee, of the Atchafalaya River, occurred in the neighborhood of Henderson and Breaux Bridge, St. Martin Parish. Special forecasts regarding the amount of rise, time of culmination, and subsequent recession of the overflow were supplied to the relief agencies.

Floods in Kansas.—On the Smoky Hill and Solomon Rivers of Kansas damaging overflows occurred between the 11th and 15th in the vicinity of Beloit, Niles, and Ogden, and again, following the rains of the 18th, in the vicinity of Minneapolis, Kans. The damage, principally to matured crops, was estimated at $141,600 for the first rise and at $278,000 for the second.

Miscellaneous.—In interior Ohio and Indiana considerable damage to farms resulted from heavy local rains and overflows from small creeks, and in the Weegee Valley of Ohio, where Weegee Creek was in flood on the 12th, two mines were flooded, with resultant temporary suspension of operations, several bridges were washed out, and other damage was done to an extent roughly estimated at $500,000.

The floods in the Atlantic, East Gulf, West Gulf, and Pacific drainages were in general of no consequence.

[All dates in July except as otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC DRAINAGE					
	Feet			*Feet*	
Susquehanna: Oneonta, N. Y.	12			12.5	23.
Santee:					
Rimini, S. C.	12	2	14	13.5	5.
		16	20	13.5	18–19.
		28	(2)	13.8	31.
Ferguson, S. C.	12	4	8	12.5	6.
		14	22	13.0	17.
		31	(2)		
Broad: Blairs, S. C.	15	(1)	1	15.8	June 30.
Saluda: Pelzer, S. C.	7	13	13	7.4	13.
Altamaha: Everett City, Ga.	10	20	25	10.3	22–23.
EAST GULF DRAINAGE					
Tombigbee: Lock No. 4, Demopolis, Ala.	39	(1)	2	42.3	June 30.
Etowah: Canton, Ga.	11	14	14	13.1	14.

[1] Continued from last month. [2] Continued at end of month.

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
MISSISSIPPI DRAINAGE					
	Feet			*Feet*	
Ohio: Evansville, Ind.	35	1	8	38.4	5.
Dam No. 48, Cypress, Ind.	35	3	8	36.9	6.
Shawneetown, Ill.	35	3	10	37.0	7.
Cairo, Ill.	45	1	9	45.6	5–7.
Tuscarawas: Gnadenhutten, Ohio.	9	22	22	9.7	22.
Green:					
Lock No. 6, Brownsville, Ky.	30	1	2	30.6	1.
Lock No. 4, Woodbury, Ky.	33	June 30	4	39.0	2.
Lock No. 2, Rumsey, Ky.	34	June 30	10	38.3	6.
Barren: Bowling Green, Ky.	20	1	2	22.4	2.
Tippecanoe: Norway, Ind.	6	2	2	6.1	2.
White, West Fork: Edwardsport, Ind.	15	9	9	15.6	9.
Cumberland:					
Carthage, Tenn.	40	1	4	45.2	2.
Nashville, Tenn.	40	(1)	7	42.9	5.
Clarksville, Tenn.	46	(1)	8	48.0	2.
Tennessee:					
Rockwood, Tenn.	20	1	2	23.4	1.
Clinch: Clinton, Tenn.	25	(1)	1	28.6	June 30.
Mississippi:					
New Madrid, Mo.	34	(1)	12	36.0	6–7.
Memphis, Tenn.	35	3	14	35.9	10.
Helena, Ark.	44	(1)	17	45.7	12–13.
Arkansas City, Ark.	48	(1)	22	52.6	6–8.
Greenville, Miss.	42	(1)	21	45.5	6–11.
Vicksburg, Miss.	45	(1)	28	49.3	11–14.
Natchez, Miss.	46	5	28	48.5	18–19.
Angola, La.	45	11	27	46.0	18–21.
Baton Rouge, La.	35	10	29	36.4	19–21, 23.
Donaldsonville, La.	28	17	25	28.2	21–23.
Illinois:					
Morris, Ill.	13	5	8	14.7	6.
Peru, Ill.	14	4	17	17.3	7–8.
		22	25	14.4	23.
Henry, Ill.	10	8	15	10.8	10–11.
Havana, Ill.	14	8	18	14.4	12–14.
Beardstown, Ill.	14	12	17	14.1	13–16.
Meramec:					
Pacific, Mo.	11	(1)	1	14.5	June 30.
Valley Park, Mo.	14	(1)	1	18.2	June 30.
St. Francis:					
St. Francis, Ark.	17	(1)	11	26.7	June 26.
Marked Tree, Ark.	17	(1)	20	18.3	5–10.
Smoky Hill: Solomon, Kans.	24	11	12	24.2	11.
Solomon: Beloit, Kans.	18	10	10	20.2	10.
		13	15	24.2	14.
		20	22	24.2	21.
		31	(2)		
Grand, West Fork: Gallatin, Mo.	20	22	25	32.7	24.
Grand: Chillicothe, Mo.	18	22	26	27.4	25.
Grand, Thompsons Fork: Trenton, Mo.	20	22	23	22.5	23.
Arkansas: Yancopin, Ark.	29	(1)	27	39.1	1–5.
White:					
Newport, Ark.	26	(1)	4	32.6	June 25.
Georgetown, Ark.	22	(1)	12	29.9	June 27.
De Valls Bluff, Ark.	24	(1)	9	28.5	June 28–29.
Clarendon, Ark.	30	(1)	11	34.9	1.
Black:					
Corning, Ark.	11	(1)	13	15.0	June 19.
Black Rock, Ark.	14	(1)	15	26.6	June 22.
Cache: Patterson, Ark.	9	(1)	9	11.8	June 27–28.
Sulphur: Finley, Tex.	24	(1)	3	28.6	June 29.
Cypress: Jefferson, Tex.	18	(1)	2	19.3	1.
Atchafalaya: Melville, La.	37	12	29	37.6	23.
Trinity: WEST GULF DRAINAGE					
Dallas, Tex.	25	29	29	25.1	29.
Trinidad, Tex.	28	2	3	28.4	3.
PACIFIC DRAINAGE					
Colorado: Parker, Ariz.	7	(1)	20	11.9	June 8.
		26	27	7.0	26–27.
Columbia: Marcus, Wash.	24	(1)	19	34.2	May 30–31.

[1] Continued from last month. [2] Continued at end of month.

MEAN LAKE LEVELS DURING JULY, 1928

By UNITED STATES LAKE SURVEY

[Detroit, Mich., August 4, 1928]

The following data are reported in the Notice to Mariners of the above date:

Data	Lakes [1]			
	Superior	Michigan and Huron	Erie	Ontario
	Feet	*Feet*	*Feet*	*Feet*
Mean level during July, 1928:				
Above mean sea level at New York	602.87	580.41	572.71	246.73
Above or below—				
Mean stage of June, 1928	+0.40	+0.29	+0.32	+0.14
Mean stage of July, 1927	+0.23	+0.83	+0.54	+0.72
Average stage for July, last 10 years	+0.80	+0.25	+0.39	+0.53
Highest recorded July stage	−0.95	−3.17	−1.70	−1.99
Lowest recorded July stage	+2.01	+1.87	+1.59	+2.14
Average departure (since 1860) of the July level from the June level	+0.21	+0.06	−0.04	−0.04

[1] Lake St. Clair's level: In July, 1928, 575.54 feet.